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HOGAN & HARTSON LLP ONE TABOR CENTER, SUITE 1500 1200 SEVENTEENTH ST DENVER, CO 80202				
EXAMINER				
SWICKHAMER, CHRISTOPHER M				
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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/669,396

Applicant(s)

WRENN, RICHARD FITZHUGH

Examiner

Christopher M Swickhamer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-17 is/are rejected.
- 7) ☒ Claim(s) 8-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to for containing hand drawn/handwritten material. Before the application can be issued, new drawings must be submitted. Appropriate correction is required.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the multiplexor of claim 17 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

- A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: on page 16, line 12, the specification refers to Figures 4C and 4D. Figures 4C and 4D were not submitted drawings. The Examiner believes this section of the specification actually refers to Figures 3C and 3D. Appropriate correction is required.

### ***Claim Objections***

4. Claim 1 is objected to because of the following informalities: In line 2, the claim states a "network fabric further comprising," but the network fabric is introduced in line 2. Thus it cannot be *further* comprising. The term "further" should be omitted. Appropriate correction is required.

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- Claim 12 is objected to because in line 2, there is an extraneous article "a" in the claim.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 17 depends from independent claim 14. Claim 14 describes the hash function address being used to address the routing table, which returns the address to pass the frame to the output port. In claim 17, the claim describes a multiplexor selecting from addresses generated by the hash function or the processors. The instant application describes this process on page 19, lns. 18-pg. 20, lns. 2. The specification is not written in such a manner that one of ordinary skill in the art would understand where the address generated from the processor is derived. Also the claim and the specification do not agree on what the multiplexor does. Multiplexing as known in the art is used to combine signals from different inputs into a single output. Multiplexing does not typically provide a selecting function as claimed. The Examiner does not believe that the written description of the claimed subject matter would enable one of ordinary skill in the art to recreate this feature.

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7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Referring to lines 2-4, the claim states "at least two switches" in lines 2-3, and "of the at least one switch" in line 4. The Examiner believes the end of line 4 should read "of the at least two switches" to agree with lines 2-3.

- Referring to claim 1, line 14, the claim states the traffic is distributed by the "switch." In lines 2-3, the claim states that there are at least two switches. The claim is indefinite since it does not disclose which switch distributes the traffic.

- Referring to claim 1, lines 15-16, the claim states "frames transmitted in a first direction." The specification does not disclose frames being transmitted in a *first direction*. The specification describes sending from a first transmitting N\_Port across a network fabric to a second receiving N\_Port. The Examiner will assume the first direction is from the first N\_Port to the second N\_Port across the network fabric.

### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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10. Claims 1-2 are rejected under 35 U.S.C. 102(a) as being anticipated by the X3.297-1996 working draft proposed by the American National Standard for Information Systems titled *Fibre Channel: Physical and Signaling Interface-2 (FC-PH-2) Rev 7.4*, (hereafter Fibre Channel).

Referring to claim 1, Fibre Channel discloses a network comprising: a network fabric further comprising at least two switches and a plurality of links, each link connected to at least one switch of the at least one switch; a first N\_Port connected to a link of the network fabric; a second N\_Port connected to a link of the network fabric (pg. 102, Fig. 96, the fabric inherently has multiple switches and multiple links); wherein there exists a first path (VC1, A to B) and a second path (VC2, A to B) from the first N\_Port to the second N\_Port through the network fabric (Fig. 96); wherein network traffic from the first N\_Port to the second N\_Port is automatically distributed between the first path and the second path by the switch (N\_Ports interface with F\_ports in the switch, which would inherently split the different VCs over different paths) such that frames transmitted in a first direction and related to any single exchange (same VC) are transmitted over the same path of the first and second path yet frames transmitted in the first direction and related to different but overlapping exchanges (same source, different VCs) need not follow the same path (Fig. 96, pg. 117, col. 2, g) and h)).

Referring to claim 2, Fibre Channel discloses the network of Claim 1, wherein the frames related to the any single exchange are identified by a switch as belonging to the single exchange through fields of a frame header comprising an originator exchange identifier field (pg. 20, Fig. 46, OX\_ID, pg. 117, h)).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 3-5, 11, 12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fibre Channel in view of Applicant's admitted prior art.

Referring to claim 3, Fibre Channel discloses the network of Claim 2, wherein frames are routed by at least one routing table located within a switch of the at least two switches (Fibre channel switches inherently have routing tables), but does not expressly disclose the routing table having inputs comprising a hash function of a destination identifier of the frame header and at least one bit of the originator exchange identifier. In the instant application, Fig. 3A and 3B, pg. 14, lns. 18-pg. 15, lns. 10, applicant admits that it is known to use a hash function based on elements in the fibre channel header to index a routing table. Specifically, the prior art uses the D\_ID field and S\_ID field to index the hash function. The Examiner believes that any field of the fibre channel header (pg. 3 of instant application) could be used as inputs to the hash function. The system of the Fibre Channel could be modified to use a hash function to index the routing table. The inputs of the hash function would be fields in the fibre channel header, specifically the OX\_ID and D\_ID fields. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system described in the Fibre Channel document, with a hash function of the OX\_ID and D\_ID fields of the frame header to index a routing table. One of ordinary skill in the art would have been motivated to do this since

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hash function can use a portion of a header to index a memory without having to decode and examine the entire header.

Referring to claim 4, Fibre Channel discloses the network of Claim 3, wherein the network comprises a switched Fibre Channel fabric (see title).

Referring to claim 5, Fibre Channel discloses the network of Claim 4, wherein the hash function has input further comprising a field selected from the group consisting of a source identifier field of the frame was received by the switch (See claim 3). Any portion of the frame and any number of different fields in the header could be used as inputs to the hash function. Therefore, the claim is rejected for reasons analogous to claim 3.

Referring to claim 11, Fibre Channel discloses a program product for distributing network traffic between a first N\_Port of a network and a second N\_Port of a network, the network having a plurality of paths for frames from the first N\_Port to the second N\_Port and at least one switch (Fig. 96), the program product operable upon said switch and comprising computer-readable code for: maintaining a routing table (switches inherently maintain routing tables), inherently causing the routing table to be accessed upon receipt of a frame, the routing table coupled to inherently determine a selected port for transmission of the frame; and inherently causing the frame to be transmitted on the selected port. The Fibre Channel working draft does not expressly disclose the routing table indexed by an output of a hash function of inputs comprising a destination identification field and an originator exchange identifier field of a header of a frame. In the instant application, Fig. 3A and 3B, pg. 14, lns. 18-pg. 15, lns. 10, applicant admits that it is known to use a hash function based on elements in the fibre channel header to index a routing table. Specifically, the prior art uses the D\_ID field and S\_ID field to



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index the hash function. The Examiner believes that any field of the fibre channel header (pg. 3 of instant application) could be used as inputs to the hash function. The system of the Fibre Channel could be modified to use a hash function to index the routing table. The inputs of the hash function would be fields in the fibre channel header, specifically the OX\_ID and D\_ID fields. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system described in the Fibre Channel document, with a hash function of the OX\_ID and D\_ID fields of the frame header to index a routing table. One of ordinary skill in the art would have been motivated to do this since hash function can use a portion of a header to index a memory without having to decode and examine the entire header.

Referring to claim 12, Fibre Channel discloses the program product of Claim 11, wherein the hash function has inputs further comprising an input selected from the group consisting of a source identifier field of the frame header (See Fig 3B of instant application) and an identity of a switch port upon which the frame was received. The instant application shows that a hash function can contain the S\_ID field of the fibre channel frame header. Claim 12 is rejected for reasons analogous to claim 11.

Referring to claim 14, Fibre Channel discloses a switch for a network capable of distributing frames received on a first port over a plurality of ports, the switch comprising a plurality of ports including a first port, the first port capable of receiving a frame (Fig. 96); a routing table capable of determining a port of the plurality of ports for forwarding a received frame based upon an address (switches inherently contain routing tables); a processor for maintaining the routing table; and apparatus for receiving a frame and for passing a received frame to the port determined by the routing table (the switch and routing table inherently perform

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these functions). The Fibre Channel working draft does not expressly disclose a hash function generator capable of generating an address for the routing table based upon information comprising a destination identification field and at least one bit of an originator exchange identifier field of a header of the received frame. In the instant application, Fig. 3A and 3B, pg. 14, lns. 18-pg. 15, lns. 10, applicant admits that it is known to use a hash function based on elements in the fibre channel header to index a routing table. Specifically, the prior art uses the D\_ID field and S\_ID field to index the hash function. The Examiner believes that any field of the fibre channel header (pg. 3 of instant application) could be used as inputs to the hash function. The system of the Fibre Channel could be modified to use a hash function to index the routing table. The inputs of the hash function would be fields in the fibre channel header, specifically the OX\_ID and D\_ID fields. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system described in the Fibre Channel document, with a hash function of the OX\_ID and D\_ID fields of the frame header to index a routing table. One of ordinary skill in the art would have been motivated to do this since hash function can use a portion of a header to index a memory without having to decode and examine the entire header.

Referring to claim 15, Fibre Channel discloses the switch of Claim 14 wherein the hash function generator is capable of generating an address for the routing table based upon information further comprising an identifier selected from the group consisting of a source identifier field of the header of the received frame and an port identifier of the switch port on which the frame is received (see rejection to claim 12).

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Referring to claim 16, Fibre Channel discloses the switch of Claim 14, wherein the hash function generator inherently further comprises devices to perform the hash function of a destination identification field and at least one bit of an originator exchange identifier field (at least one bit allows for the whole OX\_ID field to be used) of the header of the received frame, and the routing table inherently comprises a memory capable of being addressed by the address generated by the hash function.

Referring to claim 17 as best understood by the Examiner, Fibre Channel discloses the switch of Claim 16, wherein the memory of the routing table is implemented by at least one RAM (routing tables are implemented in RAM memories), the RAM being writable by the processor and coupled to be addressed through a multiplexer capable of selecting a RAM address from the group of addresses comprising an address generated by the processor and the address generated by the hash function. Routing tables can add or remove links in the table. If a new address is received, the processor would inherently create a new address in the table. If an established connection is used, the processor would inherently use the address generated by the hash function to index the table.

13. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fibre Channel and Applicant's admitted prior art in view of Stai et al (USP 6,401,128 B1, hereafter Stai).

Referring to claims 6 and 13, Fibre Channel discloses the network of Claims 4 and 11, but does not expressly disclose wherein the routing table produces an index to a second table that provides an outgoing port identifier for the switch. Stai discloses a system that uses a first table

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to access a second table to determine a PORT\_ID (Fig. 7, col. 8, lns. 20-51). The system of Fibre Channel could be modified to use multiple tables to determine the outgoing port identifier. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Fibre Channel, with multiple tables. One of ordinary skill in the art would have been motivated to do this since tables can hold only so much information, depending on the complexity of the address, and the size of the hashed address, multiple tables may be necessary to determine the output destination and port information.

14. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fibre Channel and Applicant's admitted prior art in further view of Zikan et al (USP 6,310,881 B1, hereafter Zikan).

Referring to claim 7, Fibre Channel discloses the network of Claim 4, but does not expressly disclose wherein a load-balancing task of the network updates the at least one routing table to alter a distribution of exchanges among paths. Networks typically have processes that update routing tables based on traffic conditions and link failures. Zikan discloses a system that has a load balancer that updates routing tables (col. 2, lns. 3-50). The system of Fibre Channel could be modified to include a load balancer that alters routing tables based on the distribution of exchanges among paths. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Fibre Channel, with the ability to adjust routing tables based on network conditions. One of ordinary skill in the art would have been motivated to do this so that in case of heavy loading or link failure, the system can reroute traffic to prevent unnecessary delay of frame loss.

***Allowable Subject Matter***

15. Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- Referring to claim 8, claim 8 is allowable over the prior art of record since the cited references taken individually or in combination fail to particularly disclose the network wherein the hash function further comprises a first hash sub-function of at least one bit of the destination identifier and having an output, a second hash sub-function of the at least one bit of the originator exchange identifier and having an output, and a concatenation operation of the output of the first hash sub-function with the output of the second hash sub-function. The Fibre Channel working draft and the admitted prior art disclose a similar system. However, the prior art of record fails to disclose a first hash sub-function of at least one bit of the destination identifier and having an output, a second hash sub-function of the at least one bit of the originator exchange identifier and having an output, and a concatenation operation of the output of the first hash sub-function with the output of the second hash sub-function as claimed.

***Conclusion***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- American National Standard for Information Technology, *Fiber Channel: Switch Fabric (FC-SW)* rev 3.3, October 1997.


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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M Swickhamer whose telephone number is (703) 306.4820. The examiner can normally be reached on 8:00-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (703) 305-4744. The fax phone number for the organization where this application or proceeding is assigned is (703) 872.9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305.3900.

CMS  
December 10, 2003

  
**HASSAN KIZOU**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**